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ABSTRACT

Drexel University instituted a microcomputing program in 1984 which required all freshmen to own Apple Macintosh microcomputers. All students were taught database searching on the BRS (Bibliographic Retrieval Services) system as part of the freshman humanities curriculum, and the university library was chosen as the site to house continuing end-user searching facilities. This paper describes the university's training program and the library's planning process and database searching workshops. Emphasis is placed on the use of the Macintosh and several software packages in the planning and implementation process, including developing budgets, creating instructional materials, maintaining statistics, and writing minutes of meetings. In planning the program, attention was directed toward user-operated equipment, software, search costs, and statistical reports. A discussion of training end-users focuses on three groups: faculty, freshmen, and everyone else on campus who might want to learn to do their own searching. A final section summarizes the results of the year-old program. An appendix lists and summarizes the software packages used with the Macintosh for planning and teaching. (Author/THC)

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Planning for End-User Database Searching: Drexel and the Mac: A User-Consistent Interface

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AUTHOR ABSTRACT
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Title: Planning for End-User Searching: Drexel and the Mac; a User-Consistent Interface

Abstract (up to 200 words):

In 1984 Drexel University instituted a microcomputing program which required all freshmen to own Apple Macintosh microcomputers. All students were taught database searching on the BRS system as part of the freshman humanities curriculum, and the University Library was chosen as the site to house continuing end-user searching facilities.

This paper describes the University's training program and the Library's planning process and database searching workshops. Emphasis is placed on how the Macintosh and several software packages were used to plan and implement the new program.

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Planning for End-User Database Searching:
Drexel and the Mac:
A User-Consistent Interface

At first, the phrase "user-consistent interface" seemed like just catchy computer jargon. The phrase came up at a meeting where we were discussing an end-user database searching program for Drexel University. The idea was that since all the freshmen at Drexel were being taught database searching and were also purchasing Apple Macintosh computers, they should do their database searching on Macintosh machines.

As the Hagerty Library became more involved in the Drexel "microcomputing program" this idea of a user-consistent interface took on new meaning. The Macintosh became the primary tool for the entire end-user searching project, not only as a terminal for the students to search on, but as a tool to develop budgets, create instructional materials, maintain statistics, and even write minutes of meetings. This paper discusses the planning process carried out at Drexel to put an end-user searching program in place, and the role the Macintosh played as an invaluable planning and teaching tool throughout the process.

Introduction

In January 1984 Drexel University announced the Macintosh as the "authorized" personal computer required for all incoming freshmen. The previous year had been spent mobilizing the University to become "computer literate", and faculty members had begun developing ways to integrate the Macintosh into their curricula.

The Department of Humanities and Communications saw student ability to do database searching as a key instructional objective. BRS was selected as the database vendor that appeared most interested in the project and most willing to work with Drexel in developing its program. Faculty were trained in BRS search protocol and they, in turn, taught freshmen who were taking the basic research paper course. Work began to develop a BRS Search Simulator, a software program that ran on the Macintosh.

By the end of Winter Quarter 1984 over 1800 freshmen and 40 faculty members knew how to search. By the following year, after Winter Quarter 1985 when the next incoming freshmen class was trained, we had nearly 4000 searchers on campus. It was time to establish a campus search facility for end-users. The library had already been selected as the most appropriate place for this facility and was deep into the planning process.

Planning

The library was the logical place for the service for several reasons: it had10 librarians who were trained in BRS searching and a staff familiar with such administrative procedures as monitoring and paying bills; it offered long hours of operation and and a secure area, and a Macintosh "cluster" where students were accustomed to coming to work with software and to print documents.

In the discussions that led up to our end-user searching program, several very clear objectives emerged. We wanted a system that would:

1. be easily operated by the students and available during library hours when professional staff were not available for assistance
2. provide password protection but not require a staff person to log the student on at each use
3. pass some percentage of search costs on to the user, yet free the staff from collecting money

The use of "front end" software, such as InSearch or Sci-Mate, seemed inconsistent with the search techniques our student body already knew, and gateway systems like EasyNet did not seem flexible or cost-effective enough to provide the type of system we wanted. We found that the computer vending equipment produced by CompuVend[1] met most of our objectives.

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[1]For further information contact CompuVend at 5211 Oxford Avenue, Philadelphia, PA 19124; telephone (215)533-7950.

CompuVend. The CompuVend equipment is user-operated, provides automatic log-on and password protection, and works with either cash or a debit card reader. The equipment was originally designed to vend time on the Apple II series microcomputers, but the company agreed to modify their machines to work with our "user-consistent interface", the Macintosh.

The CompuVend configuration uses a Hayes Smartmodem 1200 and a Hayes Stack chronograph to monitor time. The basic machine contains a board with 7 microchips; we also installed an optional second board which holds up to 24 microchips. Telenet phone numbers and our passwords are programmed into this series of microchips which execute automatic dialing and password entry--the log-on protocol is not visible to the user and is not accessible from the keyboard. The microchips can even be programmed to charge a variable rate according to time of day and day of week so we could provide access to the Club Mac bulletin board in Colorado, for instance, and charge different rates, according to the long distance telephone charges, for day, night, or weekend access. The CompuVend equipment provides a lot of flexibility should we wish to add new information sources to our end-user search service. Most CompuVend installations are based on lease agreements, but we purchased two units. Each unit is connected to a Macintosh with keyboard and mouse. No printers were attached as students can print a copy of their search, which is saved to disk, at print stations in the same room as the CompuVend stations.

Software. In the early stages of our project a pre-release version of MacTerminal, provided by Apple, was used to turn our Macs into terminals. Eventually, Drexel developed its own terminal emulation software, DUTalk, and made the new package available free to all Drexel students and staff. DUTalk, through agreement with Apple, is based on portions of MacTerminal and is compatable with the Macintosh environment. Searches are captured on disk and saved as documents that can be converted to MacWrite documents for editing. Thus students can cut and paste portions of their searches into bibliographies or footnotes. We interpret this editing procedure as "fair use" under copyright law in view of the software environment and the limited citation use.

One limitation the library staff found with both MacTerminal and DUTalk is that they do not allow simultaneous printing during the search. A search is saved to the disk and then must be printed as a second step. Another difficulty we had initially was that search documents could be created which were too large to be handled by MacWrite version 2.2, which can only accomodate files of up to about 10 pages. Drexel programmers had to create a utility called Slicer (provided on the DUTalk disk) which slices a long search document into smaller segments of about 10K each. The new disk-based version of MacWrite, which has not been released at this writing, will be able to manipulate longer documents.

Search Costs. Since we began offering librarian-assisted database searches in 1975, we have subsidized the cost of our searches to various degrees as our budget permitted in order to make searches more affordable for our students. Had we been able to offer free end-user searching, our planning process would have been much simpler. As it was, we had to devise a way of using the CompuVend machine, which only clocks time, to accomodate the variable rates for each of the databases. Variables included BRS's connect charges and the royalty charges for the individual databases; but the most difficult factor to calculate was the per-citation charge. Our CompuVend machines vend online usage on the basis of time, but the actual cost of a search can vary widely depending on how many citations are printed and whether they are printed with or without abstracts. Based on some experimentation, previous statistics (and some guesswork) we used 160 citations (some with, some without abstracts) being printed per hour as the basis for our charge schedule.[2]

Microsoft's Multiplan proved invaluable in calculating all these variables and to project an estimated hourly cost for each database. We also added a weighting factor based on about one year of tabulated database use by our library staff. The weighted average cost (see Figure 1) allowed us to establish a group rate which would protect us from high use of a more expensive database in a group and yet allow us to establish a reasonable rate for a lower-cost, but more heavily used, database. When groups of

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[2]Michael Halperin, who is now running an end-user search service at the Lippincott Library, University of Pennsylvania, was responsible for much of the original financial planning.

databases with similar costs were determined, we could easily calculate an overall, weighted average to charge for each group. As new databases were added or prices changed we could easily move databases from one group to another on the spreadsheet (the resulting price changes being recalculated automatically) in order to achieve a balanced set of price groupings. Figure 1 shows a section of our Multiplan spreadsheet for one of the database groups.

Figure 1

Multiplan Spreadsheet for Database Group 1

CODE	NAME	COST PER HR	COST PER CIT	WEIGHT	UNWEIGHTD COST	WEIGHTD COST
CROS	Cross	$16.00	$0.00	92	$16.00	$1472.00
ERIC	ERIC	$16.00	$0.04	187	$22.40	$4188.80
FILE	BRS Files	$16.00	$0.00	1	$16.00	$16.00
FSIS	Frost & Sullivan	$16.00	$0.04	1	$22.40	$22.40
GPOM	GPO Monthly Cat.	$16.00	$0.04	24	$22.40	$537.60
NCMH	NIMH	$16.00	$0.04	3	$22.40	$67.20
PREP	Pre-Psyc	$16.00	$0.04	1	$22.40	$22.40
RIVE	Vocational Educ.	$16.00	$0.04	1	$22.40	$22.40
ROME	Educ. Meetings	$16.00	$0.04	1	$22.40	$22.40
VECM	Vocational Educ.	$16.00	$0.04	1	$22.40	$22.40
TOTAL				312	$211.20	$6393.60
AVER					$21.12	$20.49

Drexel negotiated a Mini-group contract with BRS which allowed us to receive 20 passwords, ten for each of two machines. The passwords were programmed to block specified databases as well as access to the accounting file (ACCT), messages (MSGS), offline prints, SDI profiles, and permanent saves. CompuVend then programmed each microchip in our equipment with a specific password and charging rate. The BRS databases were placed in one of nine groups (and BRS After Dark in the tenth), each with a different password and charging rate. Thus a student who wanted to search ERIC would be logged-on through a specific microchip and charged at a lower rate than a student who chose the more expensive group with ABI Inform. All BRS After Dark databases are vended at one rate.

Since Multiplan is consistent with the Macintosh environment we were later able to cut and paste parts of our spreadsheet into MacWrite to produce a list of database groups and the files in each group (see Figure 2). Using Multiplan's sort function we were also able to easily compile an alphabetic listing of all the databases and their respective costs. These lists were posted at our CompuVend stations and handed out at our training sessions, discussed below.

Figure 2
MacWrite Document Created from Multiplan File

BRS DATABASE GROUPS

Group*00	$1.00 for 2.9 minutes	
	CROS	Cross
	ERIC	E. R. I. C.
	FILE	FILE
	FSIS	Frost & Sullivan Market Rsch.
	GPOM	Monthly Catalog of US GPO
	NCMH	Nat. Inst. of Mental Health
	PREP	Pre-Psyc
	RIVE	Resources in Vocational Educ.
	ROME	Research Org. & Meetings Educ.
	VECM	Vocational Educ. Current Materials

Statistical Reports. A campus committee charged with the task of selecting a "university standard" database management program for the Macintosh recommended Desktop Software's 1st BASE. 1st BASE is an easy-to-learn, simple-to-operate program with many powerful features. We used 1st BASE to maintain a database of all the CompuVend searches. Each search was entered in our database as a single record which contained the date, time online (in decimal hours), database name, group number, and the cost of the search. Figure 3 shows a table that we will use to evaluate the correctness of our charging algorithm. The table contains information from the first two months of our end-user service and includes the databases

searched, the total number of hours online for each database, and the total cost as recorded from our BRS bills. The two additional variables are created by using the 1st BASE report writer. "Vend Price" multiplies the number of connect hours by the rate we are charging for a database according to the group it is in. "Loss/gain" subtracts the cost (as charged by BRS) from the vended price (our charges) to calculate the amount we are overcharging or undercharging for our service. These figures have limited use now because they are based on a small number of searches, but this type of reporting capability from 1st BASE will become increasingly valuable in the future as we evaluate our service.

1st BASE reports can be transfered into MacWrite for editing to improve their appearance or, as we have done here, for incorporation into the text of a document.

Figure 3
1ST BASE Statistical Report

COMPARISON: BRS COST VS. CompuVend CHARGES

DATABASE	HRS ONLINE	BRS COST	VEND PRICE	LOSS/GAIN
A400	0.111	$7.98	$8.88	$0.90
ABLE	0.037	$2.31	$2.67	$0.36
BIOL	0.137	$2.68	$2.49	-$0.19
CANE	0.035	$0.35	$0.64	$0.29
CFTX	0.020	$0.42	$0.36	-$0.06
CHEM	0.282	$22.31	$14.92	-$7.39
ERIC	1.464	$34.11	$29.49	-$4.62
INFO	0.341	$17.21	$11.95	-$5.26
LLBA	0.224	$4.48	$4.07	-$0.41
MESH	0.042	$0.84	$0.76	-$0.08
MGMT	0.016	$0.99	$1.92	$0.93
MS74	0.020	$0.40	$0.36	-$0.04
MS78	0.037	$0.74	$0.67	-$0.07
NCMH	0.069	$1.76	$1.43	-$0.33
PAIS	0.073	$0.95	$1.33	$0.38
PSYC	0.137	$1.95	$2.49	$0.54
SOCA	0.263	$6.47	$7.34	$0.87
SSCI	0.259	$5.18	$4.71	-$0.47
VECM	0.017	$0.37	$0.35	-$0.02
TOTAL	3.584	$111.50	$96.84	-$14.66

Training End-Users

In most library end-user searching programs, the library staff takes on the role of instructing new users. We were fortunate in that there was a strong commitment from the humanities faculty to teach database searching to each incoming freshman class as part of the regular curriculum.

Teaching Faculty. The project began with three faculty who basically taught themselves to search with some help from people on campus who were already doing or teaching searching. These three faculty taught three sections of "Reading and Research", a basic research and composition course, during Fall Quarter 1983. Based on their experience, they then developed a workshop to train 40 faculty who would be teaching this course to over 1800 students, primarily during the Winter Quarter 1984.

Teaching Freshmen[3]. Teaching styles and points of emphasis varied among the faculty. Some stressed the technical side of searching covering Boolean logic, the hierarchy of operators, or the structure of a print command. Others felt that this technical material was easiest to learn and that the more important area of emphasis was the overall definition of the search topic and the selection of search terms. Keyword selection, in fact, became an important pedagogical tool to help students define and narrow the topic for their papers.

The BRS Search Simulator (see above), developed by Harold Kollmeier (Department of Humanities and Communications) and John Harvey (Instructional Support Group) proved to be the ideal tool to teach the technical end of searching. It simulates the BRS search environment, and includes most commands and a small database so students can practice by running sample searches without incurring the cost of being online with BRS.

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[3]For a more detailed description of this process see the paper Composition Students On-line by Harold H. Kollmeier and Kathleen Henderson Staudt, Microcomputing Working Papers Series, No. 84-F2, June 1984, available from Microcomputing Program, Drexel University, Philadelphia, PA 19104.

Actual time online was also provided in a laboratory (affectionately known as "the BRS room") which was set up with about twenty dumb terminals in a classroom building. The Macintoshes had not been received when the first freshman class was trained (a violation of the user-consistent interface principle), but by Winter Quarter 1985 all Macintoshes had been installed and hard-wired to Telenet. Each class met in the BRS room for one half-hour of hands-on, online experience with BRS. Each student was also given a credit slip worth an additional half-hour of searching if they wished to come back and refine their search or search a new topic. The authors looked at a number of searches done by students in the laboratory and found the expected range of typical problems of new searchers but no particularly prominent errors.

During the training period, the library's role in the project occurred only when students began appearing at the Reference Desk with searches in hand asking for help to locate the references cited in their searches. The students discovered that the most difficult part of their research process, locating the actual documents, was about to begin. Frustration often resulted when a student discovered that journals cited in his or her search were not available in Drexel's library or any area collection. The short ten week quarter often made the use of interlibrary loan impractical, especially for the student who put off working on the paper until late in the term. Sometimes they found that their searches were useless. Several students, for example, had what appeared to be successful searches on Dissertation Abstracts only to discover that it is nearly impossible to obtain copies of dissertations short of purchasing a copy from University Microfilms. The databases available on BRS do not strongly support research on literary or historical topics so students frequently chose inappropriate databases. The faculty interest in online searching as a "process" sometimes came into conflict with the student's interest in a "product."

Teaching Everyone Else. By the time our CompuVend machines had been installed, December 1984, two classes of freshmen had been trained and a firm commitment made to teach searching as part of the freshman humanities sequence. But that still left over 8,000 students, faculty and staff on campus who had not been trained but might want to learn to do their

own searching. The library staff, which had done about 3500 database searches the previous year, was quite eager to put searching in the hands of the end-user.

So it appeared that, while faculty from the Department of Humanities and Communications trained the freshmen, it would be up to the library reference staff to train the rest of the University. We knew we had a continuing education problem.

One librarian who was taking primary responsibility for the end-user searching project developed a one-hour instructional workshop to introduce faculty and upperclass students to database searching. The rationale for such a short session was that most end-users would have class schedules which would preclude typical half- or full-day programs. Workshops were held in a lecture room in the library and scheduled for the lunch hour (12:30 to 1:30) to reduce conflict with class schedules; later, some evening workshops were also offered. Initially, one session per week was held.

The BRS Search Simulator was used as the basis of the workshop. A Macintosh connected to a monitor was used to display search commands and techniques. The workshop consisted of lecture and demonstration only--no hands-on practice time was provided. However, copies of the BRS Search Simulator software were available for loan from our Non Print Section for use in the library's Macintosh cluster, and a debit card worth five dollars of free search time on our CompuVend machines was provided for each person attending the workshops.

We assumed no prior knowledge of any aspect of database searching, and, as a result, we could cover only the most basic concepts--definition of terminology, review of the Boolean and adjacency operators, truncation, BRS commands, and how to choose a database. We also reviewed in detail the instructions for use of the CompuVend machines. We distributed handouts consisting of CompuVend instructions and abbreviated BRS search guides.

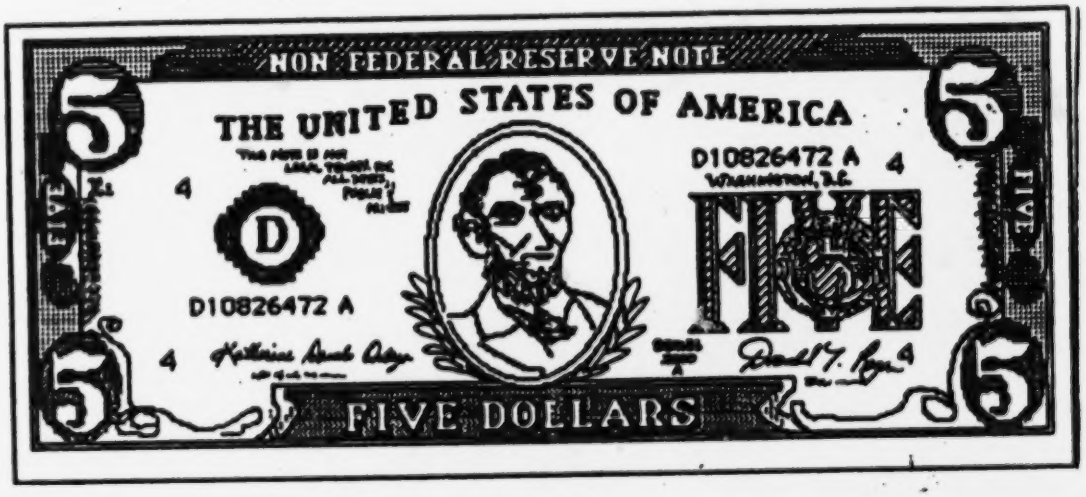
MacWrite was invaluable in helping to prepare our instructional materials. Its wide variety of fonts and type sizes and styles made our handouts attractive and readable. We used the library's regularly published

News Release to announce the workshops and the $5.00 free search time. The illustration from that News Release (Figure 4) is an excellent example of the graphic capabilities of MacPaint.

We plan to continue presenting this introductory workshop on a regular basis, and to begin an "advanced" workshop on search term selection, use of subject headings, descriptor codes and thesauri, and other topics as the demand arises.

Figure 4

Illustration from Library News Release



Results

Our end-user searching program was implemented in January 1985. We feel it has been slow to take off. During the first few months of operation we have averaged less than one search per day. The freshmen we expected to become end-users have not shown much interest. Considering that undergraduates have represented less than 20 percent of our librarian-assisted searches, their lack of interest may not be surprising. We expect, however, that usage will increase over time as more incoming classes are trained, and as our undergraduate students become upperclass and graduate students and have more papers to write. We hope eventually to bring our training sessions to other classes, especially graduate business students who are presently the largest class of users of our librarian-assisted search service. BRS is planning to add the *Arts & Humanities Citation Index* to its list of databases, which will make our BRS service more useful to students searching arts and humanities subjects.

The flexibility inherent in our CompuVend equipment will allow us to add additional information services by adding new microchips to our machines. Presently we are considering Knowledge Index, DIALOG's menu-driven system, similar to BRS After Dark, which is available at reduced rates during the evening hours. We are also considering Compuserve, Telenet access for persons with their own accounts with Telenet accessible services, and "Dragonland", a local Macintosh based bulletin board.

We feel that the system we have begun with our end-user searching program, a user-consistent interface linking the Macintosh, CompuVend, and BRS, is one which is flexible enough to grow and change to meet our students' changing information needs.

APPENDIX

We have noted throughout this paper the ways we used the Macintosh as a planning and teaching tool. In this Appendix we will list our favorite software and summarize how we used it.

Macwrite. MacWrite is easy to learn, simple to use, and fast. We used it for instructional materials, news releases, signs, correspondence, and minutes of our meetings. Its main limitation is that it cannot support documents over about 10 pages, but we have seldom found this to be a problem. This paper is written on MacWrite and fits in three files. If you need a word processor with more features we recommend exploring the forthcoming disk-based MacWrite or Microsoft Word.

MacPaint. You have to work with MacPaint to appreciate its incredible sophistication and power as a graphics program. We used it to illustrate our news releases.

DUTalk and MacTerminal. These terminal emulation programs have all the features we have needed to access BRS and other information services. Documents created from a search can be converted to MacWrite for editing. The only thing we missed was the ability to print while receiving data.

Multiplan. Microsoft's Multiplan is a spreadsheet tool which was invaluable for our financial planning. We also like its alphabetic sort capability which we used to create a database listing. Another powerful feature is the ability to paste parts of a spreadsheet into a MacWrite document, as we did in Figure 1 in this paper.

1st Base. DeskTop Software's 1st Base is an easy program to learn and use. It has some powerful relational capabilities (the ability to join different files) and some programming features (the ability to write "if...then...else" arguments and specify AND, OR, and NOT conditions.) We use it to keep statistics of our CompuVend machine use.

BRS Search Simulator. This program simulates BRS searching and contains a small database allowing the user to practice in an environment very close to actually being online. It is a tremendous cost saver for someone who wants to learn searching or review their skills before going online for a search. We use it in our training sessions and have it available for loan in the library. Drexel is planning to make this program commercially available soon.